

# **The Scottish Adolescent E-cigarette User: Profiling from the Scottish Adolescent Lifestyle and Substance Use Survey (SALSUS)**

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## **Abstract**

**Objectives:** Profiling the Scottish adolescent e-cigarette user

**Study design:** 283 state, independent and grant maintained schools participated in the Scottish Adolescent Lifestyle and Substance Use Survey (SALSUS) between September 2013 and 2014. 33,685 13 and 15-year-old pupils who had completed the cross-sectional survey SALSUS questionnaire, and answered the question based on e-cigarette use were included in the analysis. Profiling of the typical Scottish adolescent e-cigarette user through gender, age, socioeconomic status, urban/rural location, weekly alcohol consumption, current drug use and current tobacco smoking was the main outcome measured.

**Results:** 1.1% of adolescents were current e-cigarette users with 11% having tried the devices before. Current e-cigarette users were significantly more likely to be male (OR=1.9; CI= 1.5-1.9), rural (OR= 1.4; CI=1.1-1.9), smoke tobacco (OR=21.1; CI=15.3-29.1), weekly alcohol (OR=1.4; CI=1.1-1.9) and current drug users (OR=2.3; CI=1.7-3.0). There were no significance differences observed for socioeconomic status. Similar results were observed for those using both and those who only used e-cigarettes. Only tobacco smokers differed in that they were significantly more likely to be female than male (OR=0.56; CI=0.51-0.63) and of a lower socioeconomic status (OR=1.3; CI=1.1-1.4).

**Conclusions:** The Scottish adolescent e-cigarette user is male, lives rurally, a weekly alcohol drinker, a current drug user and a tobacco smoker. This profiling study helps to inform policy makers targeting e-cigarette use. Further research requires a longitudinal study and monitoring the changing views of this group.

**Keywords:** E-cigarette, Scottish, Adolescent, Profile, Public health

## Introduction

E-cigarettes are relatively new devices, which are growing in popularity among adolescents. Marketing is frequently focused on promoting e-cigarettes as smoking cessation aids. Although there appears to be consensus that e-cigarettes are less harmful than smoking tobacco[1], evidence for their role in harm reduction through their long-term efficacy in aiding smoking cessation among adults is being challenged.[2] As use of these devices is increasing globally among the adolescent population of smokers and non-smokers alike[3], there has been a focus on the potential for e-cigarettes to act as a 'gateway' to tobacco smoking, or to re-normalise smoking among this age group. In this context, it is important to understanding the factors associated with e-cigarette use among adolescents. Studies from Wales and North-east England suggest that adolescent e-cigarette users tend to be male, live in an urban environment, are current smokers, have used cannabis previously and are weekly drinkers, with no correlation to deprivation.[4,5] This study will provide the first national scale profiling of Scottish adolescent e-cigarette users, which may be used to develop policies towards specific groups.

Data were from the Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS) 2013. This school-class based cross sectional self-report survey, funded by Scottish Government included 33,685 pupils, aged 13 and 15 years old from 283 schools, with a pupil response rate of 90%. Further details of the survey methodology is available from the SALSUS technical report.[6]

Descriptive statistics of all outcomes were investigated. Odds ratios of being an e-cigarette user were calculated through logistic regression including all candidate variables (age, gender, Low socio-economic position, rural environment, current alcohol and drug use and current smoking status). Multinomial logistic regression was used to differentiate between predictive factors for the three subgroups; e-cigarette use only, current tobacco use only and dual users. Analyses were performed using SPSS v22.

## Profile of Scottish adolescent e-cigarette users

Of the 33,685 adolescent surveyed, 1.1% were current e-cigarette users (within the last month), 11.6% said that they had ever tried e-cigarettes and 8.1% currently only smoked tobacco. Of the adolescents who currently used e-cigarettes, 26% only used e-cigarettes, while the remaining 74% said they used both e-cigarettes and smoked cigarettes (dual users).

In adjusted models, males (OR=1.9; CI= 1.5-2.4), and rural (OR= 1.4; CI=1.1-1.9) adolescents were significantly more likely to currently be using e-cigarettes than their peers. Weekly alcohol use (OR=1.4; CI=1.1-1.9), current drug use (OR=2.3; CI=1.7-3.0) and tobacco smoking (OR=21.1; CI=15.3-29.1) were also significantly associated with current e-cigarette use.

Subdividing current e-cigarette and conventional cigarette users into sole and dual users permits a comparison of predictive factors for these different types of use. Among pupils who only used e-cigarettes, being male (OR=2.4; CI=1.5-3.9), a weekly drinker (OR=3.7; CI:2.0-6.8), and current drug user (OR=7.9; CI=4.2-14.8) had higher odds of current e-cigarette use only. Being older (aged 15 years) (OR=3.2; CI=2.8-3.7), of a lower socioeconomic status (OR=1.3; CI=1.1-1.4), from a rural area (OR=1.2; CI=1.1-1.4), a weekly drinker (OR=6.5; CI=5.7-7.4) or current drug user (OR=21.9; CI=19.0-25.3) was associated with higher odds of smoking only tobacco, and being male (OR=0.56; CI=0.51-0.63) with lower odds. The odds of currently using e-cigarettes and tobacco together (dual user) were higher if the adolescent was older (age 15) (OR=2.6; CI=1.8-3.8), from a rural location (OR=1.9; CI=1.4-2.6), a weekly alcohol drinker (OR=7.8; CI=5.8-10.5) and current drug user (OR=44.5; CI=32.9-60.3).

## Interpretation

Current e-cigarette use among adolescents in Scotland in 2013 was 1.1%, which is at the lower end of published prevalence rates for this age group from other countries that have examined current e-cigarette use.[5,7,8] In addition, the ever use of e-cigarettes among

adolescents in this study is only at 10%, indicating that e-cigarette use among this age group may currently not be as wide spread in Scotland as in other countries. Continued monitoring of e-cigarette use may however see rapid increases in use as has been seen in other European countries.[8] The profile of the Scottish current e-cigarette user is consistent in many ways with other reports: adolescents who were currently using the devices were more commonly male, weekly alcohol drinkers, current drug users and current smokers. E-cigarette users in Scotland were more likely to be from a rural area. The majority of e-cigarette users are in fact dual users, also smoking conventional cigarettes. Looking more closely at the sub-categories of user, the only factors that predicted solely e-cigarettes use were male gender, alcohol and drug use. Being from a rural area was not predictive of e-cigarette only use, but was predictive of tobacco use or dual use and lower socio-economic status was only predictive of sole tobacco. This may suggest that the rural/urban and socio-economic inequalities associated with tobacco smoking are less strong for e-cigarette use in this age group in Scotland. Age was not a predictor of e-cigarette only use, but was a strong predictor of tobacco or dual use. The majority of e-cigarette users are in the older age group, and this may be why age was not found to be a predictor of e-cigarette only use. However, if as in other countries e-cigarette use continues to climb among adolescents, future analyses may be able to indicate more reliably if age effects differ between e-cigarette users and conventional cigarette users. In contrast with the e-cigarette or dual users, pupils who smoked only tobacco were more likely to be female suggesting a strong gender pattern of preference for e-cigarettes in Scotland as elsewhere.

The use of e-cigarettes in conjunction with smoking is of significant public health interest. Additional longitudinal data are required to determine if e-cigarette use is related to future tobacco smoking in this age group, is due to the wish to reduce tobacco smoking or as a perceived less harmful way of smoking, or perhaps to consume nicotine in areas where smoking is not allowed (although use of e-cigarettes is now often explicitly included in individual premises smoking bans). In Scotland the ban on smoking in public places and subsequent tobacco control legislation has helped to reduce smoking in both adult and adolescent populations. Our findings suggest the possibility that non-smokers who would be less likely to take up smoking conventional smoking (such as younger males, and those from higher socio-economic backgrounds) may be susceptible to e-cigarette use. If use of e-

cigarettes does increase the likelihood of subsequent conventional tobacco smoking within the adolescent years this is of particular concern, indicating that the particular subsets of adolescents traditionally considered as at risk for smoking uptake may have to be expanded. E-cigarettes use among adolescents in Scotland should be carefully monitored to determine the potential impact on future tobacco use.

## **Contribution to literature**

The presented analysis describes the profile of the Scottish adolescent e-cigarette user. The large population sample allows a greater understanding of the extent of e-cigarettes use in Scotland nationally. The low prevalence of current e-cigarette use contrasts with other countries, but similar factors predict use. Contrasting the profiles of non-smokers who are e-cigarette users with those who solely use tobacco suggests that there are differences in predictive factors which may have implications for subsequent tobacco use indicating the need to carefully monitor the effects of e-cigarette use in longitudinal studies.

## **Abbreviations**

SALSUS = Scottish Adolescent Lifestyle and Substance Use Survey

OR = Odds Ratio

CI = Confidence Interval

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## **Competing Interests**

All authors declare: no support from any organisation for the submitted work; no financial relationship with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Ethical approval: This study was approved by the University of St. Andrews Teaching and Research Ethics Committee (MD9329, 2<sup>nd</sup> March 2015).

## **Authors Roles**

NK wrote the manuscript and conducted statistical analysis. DC advised on statistical analysis and manuscript content. All authors contributed to development of paper plans and provided comments on drafts of the manuscript.

## **Data Sharing Statement**

Unpublished data can be obtained from the SALSUS 2013 data set, which can be accessed through the UK Data Archive.

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